
MATH241 3.8 Practice

Problem 1: *A baker in a cottage is testing out some new pie recipes they had written which involve chilling the pastry overnight. When the pie comes out of the oven, it has an internal temperature of 300 degrees Fahrenheit; however, their fridge can only cool items which are at temperatures of 175 degrees or lower. The baker decides the best way to cool down the pie until it reaches fridge-safe temperatures is to leave it on the windowsill. With the window open, the temperature of the air around the windowsill is 68 degrees; after leaving the pie on the windowsill for 10 minutes, they find its temperature has cooled to 225 degrees.*

- (i) *How long will it take for before the pie can safely be put into the fridge to cool overnight?*
- (ii) *If a flock of ravens showed up 15 minutes after the baker leaves the pie on the windowsill, will the pie have cooled enough for the baker to put it away and save it from ravenous birds?*

Solution:

Problem 2: *Suppose we take \$3500 and invest it with a 3.5% interest rate.*

- (i) *How much will the investment be worth after 5 years if it is compounded annually?*
- (ii) *How much will the investment be worth after 5 years if it is compounded monthly?*
- (iii) *How much will the investment be worth after 5 years if it is compounded weekly?*
- (iv) *How much will the investment be worth after 5 years if it is compounded daily?*
- (v) *How much will the investment be worth after 5 years if it is compounded continuously?*
- (vi) *Suppose we wanted to buy a \$5000 used car with the investment return. About how long would we have to wait for us to have enough if the investment is compounded continuously?*

Solution:

Problem 3: *Suppose Car A and Car B take off from a gas station at the same time, where Car A travels directly east at a rate of 45 mi/h and Car B travels directly north at a rate of 30 mi/h. What is the rate of change for the distance between the two cars after 1.5 hours?*

Solution:

Problem 4: *A kite 125 ft above the ground moves horizontally at a speed of 10.5 ft/s. The birds from Problem 1 admire the kite on their way out to the cottage. At what rate is the angle between the string and the horizontal decreasing when 175 ft of string has been let out?*